Remarks:

Claims 1 to 5, 11, and 12, as amended, plus new Claims 13 and 14, are presented for reconsideration. Claims 6 to 10 have been canceled.

Claim 1 and dependent Claim 4 were rejected under 35 U.S.C. 102(b) as being allegedly anticipated and unpatentable over Angerhofer et al.; the remaining Claims 2, 3, Claims 5, 11 and 12 were rejected under 35 U.S.C. 103 as being allegedly obvious and unpatentable over Angerhofer et al. in view of one or another of Jay and Woods et al.

Applicant urges that independent Claims 1 and 11, as amended, together with their respective dependent claims, overcome any rejection based on these references.

Claim 1 now clearly recites that there are a pair of lip seals (e.g., 36 and 42) separated from one another at opposite ends of the shaft housing (e.g., 22), and that the drive shaft has a constant diameter through the shaft housing and at the positions where it contacts the lip seals; and further recites that the lip seals each have an annular lip that extends along shaft in the distal direction and lies against a circumferential surface of the shaft. This produces the result that when cleaning fluid is applied under pressure into the shaft housing, the fluid sprays against the proximal side of said impeller. The spray of cleaning fluid exits from the interface between the lip seal and the circumferential surface of the shaft, and covers the entire proximal surface of the impeller as well as that portion of the shaft between the housing and the impeller.

Independent Claim 11 contains similar limitations, namely, that the shaft housing further includes at least one lip seal disposed over said drive shaft at the distal end of the shaft housing, that the drive shaft has a constant diameter, i.e., without flange rings or step-ups in diameter, at least through the distal end of said shaft housing, at the positions of said lip seals, and to the distal end of the shaft; that the lip seal has an annular lip that extends along said shaft in the distal direction and lies against a circumferential surface of said shaft, such that when said cleaning fluid is applied into the housing, the fluid passes the lip of the lip seal at the interior end of the shaft housing, so that the fluid sprays against a proximal side of said impeller.

The arrangement as specifically recited in Claims 1 and 11 has numerous advantages over the prior art as exhibited, e.g., in the Angerhof and Jay references. The shaft of constant diameter through the housing and to the interior or distal end (where the impeller is attached) allows the shaft to be inserted from the outside, and withdrawn from the outside, when need be, once the impeller is removed. The absence of any flange ring, shoulder, or step-up in diameter at the impeller end or beyond the lip seal 36 permits the spray that emerges from the lip seal to reach all parts of the back surface of the impeller 24 and all portions of the shaft 28 out to the impeller, for effective cleaning in place.

Angerhof et al. has structure quite different from this invention. The Examiner points to elements 55 and 66 of Angerhof et al., which are quite different from the lip seals 36 and 42 of the disclosed embodiment of this invention. Angerhof's sealing element 55 (col. 3, lines 39 - 45) is unlike the lip seals of this invention. Rather, Angerhof's sealing element 55 has a tubular portion lying over the distal end 30 of the shaft, and lacks any flanges or other structure that could be interpreted as a lip portion. Moreover, the distal end 30 of Angerhof's shaft is shown as being of greater diameter than the rest of the shaft 36. Consequently, any cleaning spray emerging from the vicinity of the sealing element 55 will be blocked from reaching the center portion of the impeller, due to the stepped up diameter at the portions 30 and 26. In addition, there is a diameter change in the shaft 36 within the shaft housing and towards the proximal seal 66. The seal 66 also lacks any structure that corresponds to the lip seal as specifically recited in Claim 1.

As for the Jay reference, Jay clearly lacks the pair of lip seals as employed in this invention. Rather, Jay employs a only single seal element 10 that is mounted into a tapered aperture, and which requires one of its lips 32 to engage an annular flange 18 on the shaft 14. This flange 18 precludes insertion or withdrawal of the shaft from the back or outer side of the tank or vat. Also the presence of the flange 18 on the shaft blocks the spray of cleaning fluid from reaching the center part of the back or proximal side of the impeller. This makes cleaning-in-place rather difficult, as a separate spray means has to be added to clean that portion of the

shaft and impeller.

Woods et al. is directed to a fan impeller in which the blades are seated into a hub. Woods shows the blade roots 25, 26, 27, 28, and 29 (Fig. 3) to have a reduced diameter at one portion. There is no suggestion in this reference about any particular configuration for the rotary drive shaft, as Wood et al. does not show or describe the drive shaft on which the hub would be mounted. Wood et al. does not suggest that the impeller hub should be friction fit onto the distal end of the drive shaft.

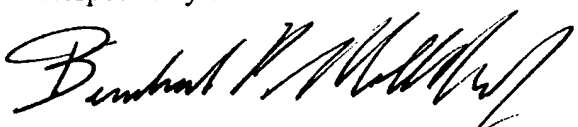
An example of an arrangement in which the impeller is removably mounted onto the distal end of the shaft, and held by a non-threaded means, e.g., a pin, is shown in the attached drawing sketch, i.e., Exhibit A.. The C.I.P. spray of cleaning fluid is shown in arrows.

The cited references also fail to show or suggest the features introduced in the dependent claims, such as Claims 3, 5, 12, and new claims 13 and 14.

Additional patents to Miyahara, Jekat et al., Wennberg et al., Huff, Gambrill, Brunson et al., Brigham et al., Ritzie, Algers et al., Sjoholm et al., Scott et al., Borraccia et al., Thomas, and Killough were cited of record, but not relied on. Applicant agrees with the Examiner's assessment that these additional references do not disclose or suggest the subject matter of the claims now being asserted.

In view of the foregoing amendments and remarks, Applicant respectfully urges that the Claims now being asserted, namely, Claims 1 to 5, 11, 12, 13 and 14 clearly define over the prior art, and Applicant requests early and favorable consideration.

Respectfully submitted



Bernhard P. Molldrem, Jr.
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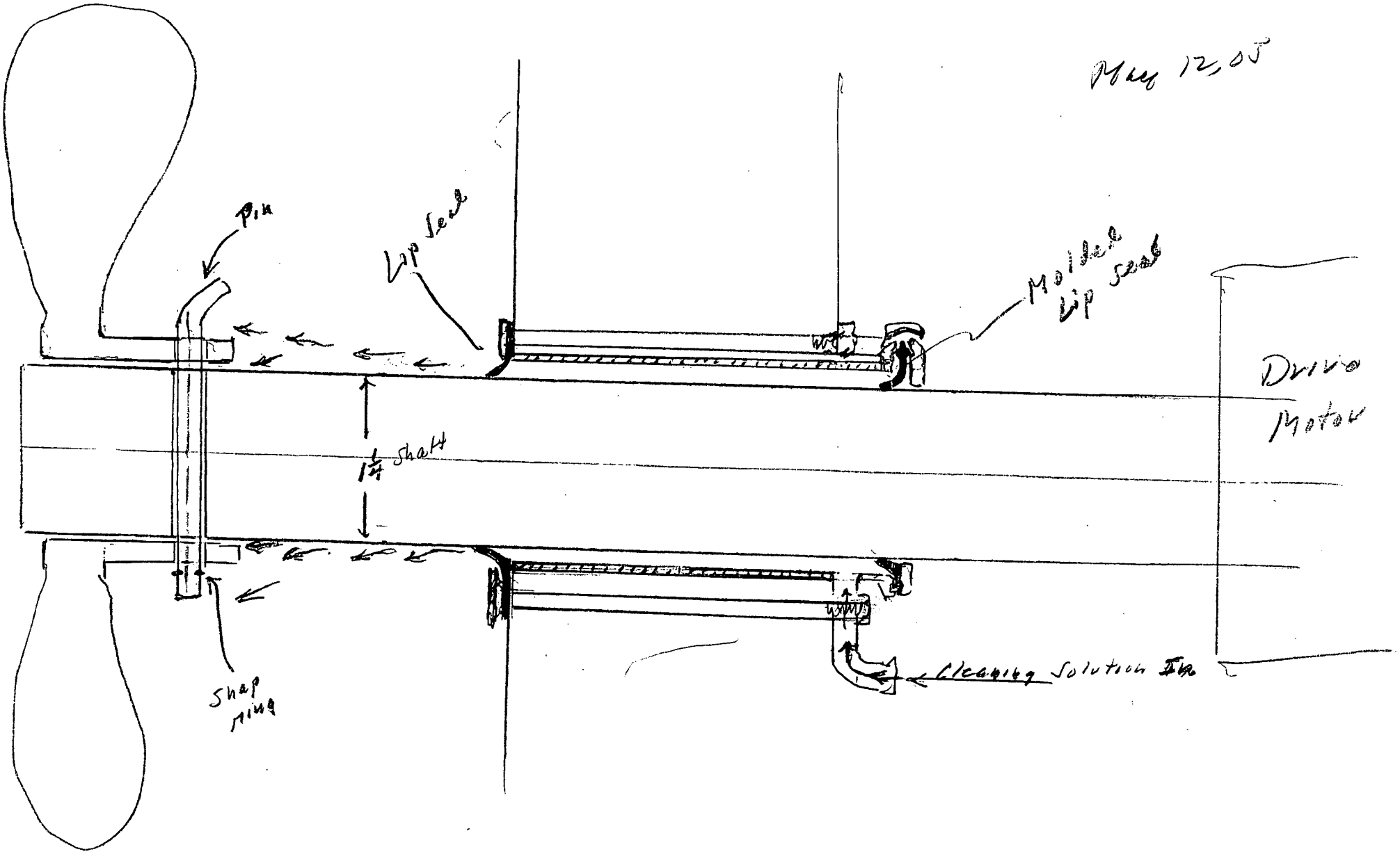
Encl.
Exhibit A



R. H. Feldmeier

EXHIBIT A

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